

CLAIMS

1. A differential gear unit (100) which divides an input driving force into a first output and second output and permits a difference between a rotational speed of the first output and a rotational speed of the second output, and which includes a casing (120) that defines an internal space (120i) and an opening (120h) communicated with the internal space (120i) and that is rotatable in a given rotational direction and in a rotational direction opposite to the given rotational direction, the casing (120) including an input portion in which the driving force is input, characterized in that
the casing (120) is configured such that fatigue life of the casing (120) when the driving force is repeatedly input in the input portion in the given rotational direction (R1) is longer than fatigue life of the casing (120) when the driving force is repeatedly input in the input portion in the rotational direction opposite to the given rotational direction (R2).
2. The differential gear unit according to claim 1, characterized in that
rotation in the given direction (R1) is rotation in a direction in which a vehicle runs forward.
3. The differential gear unit according to claim 1 or 2, characterized in that
a dividing mechanism which is provided in the internal space (120i) and which divides the driving force into the first output and the second output; and a support member which is provided so as to contact the casing and so as to support the dividing mechanism are further provided, and.
the dividing mechanism includes a pinion (143), and the support member includes a pinion shaft (141) which supports the pinion (143) such that the pinion can rotate on its axis and which makes the pinion (143) revolve around a center of the casing (120).
4. The differential gear unit according to claim 3, characterized in that
the casing (120) includes a support portion which contacts the support member, and the fatigue life is measured by inputting the driving force in the input portion without rotating the support portion.

5. The differential gear unit according to claim 1 or 2, characterized in that
the casing (120) includes an output portion which is provided at a position that is different from a position of the support portion, and the fatigue life is measured by inputting the driving force in the input portion without rotating the output portion.
6. The differential gear unit according to any one of claims 1 through 5, characterized in that
the fatigue life of the casing (120) is adjusted by making a shape of the opening (120h) asymmetrical with respect to a rotational axis of the casing (120).
7. The differential gear unit according to claim 6, characterized in that
the opening (120h) is in a rectangular shape having a round shape at each of corner portions, and the round shapes of the adjacent corner portions are different from each other.
8. The differential gear unit according to claim 7, characterized in that
a curvature radius of the round shape of the corner portion of the opening (120h), where a tensile stress is generated when the driving force is input in the given rotational direction (R1), is larger than a curvature radius of the round shape of the corner portion of the opening (120h), where a compression stress is generated when the driving force is input in the given rotational direction (R1).
9. The differential gear unit according to any one of claims 1 through 8, characterized in that
the fatigue life of the casing (120) is adjusted by performing heat treatment on a predetermined portion.
10. The differential gear unit according to claim 9, characterized in that
heat treatment is performed on the corner portion of the opening (120h) of the casing (120), where a tensile stress is generated when the driving force is input in the given rotational direction (R1).
11. The differential gear unit according to claim 9 or 10, characterized in that
the heat treatment includes at least one of induction hardening and carburizing

treatment.

12. The differential gear unit according to any one of claims 1 through 8, characterized in that
the fatigue life of the casing (120) is adjusted by performing physical treatment on a predetermined portion.
13. The differential gear unit according to claim 12, characterized in that
the physical treatment is performed on the corner portion of the opening (120h) of the casing (120), where a tensile stress is generated when the driving force is input in the given rotational direction (R1).
14. The differential gear unit according to claim 12 or 13, characterized in that
the physical treatment includes at least one of shot blasting and shot peening.